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㉖ **LIQUID APPLICATOR.**

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㉗ This invention relates to a liquid applicator (10) having a container (11) for a liquid and an applying member (12) held in the container (11) and capable of applying the liquid to an object, wherein the applying member (12) is provided so that it can be moved toward the inside and outside of the container (11), a resilient member (17) which is adapted to urge the applying member (12) toward the outside of the container (11) is provided, the applying member (12) is forced into the inside of the container (11) against the resilient force of the resilient member (17) so as to cause the liquid to ooze out to the outer surface of the applying member (12). When a container (11) made of a tough and hard material

and having an arbitrary capacity is used to make the liquid stored therein ooze out smoothly to the outer surface of an applying member (12), the liquid can be applied to the object properly and effectively.

FIG.1(B)

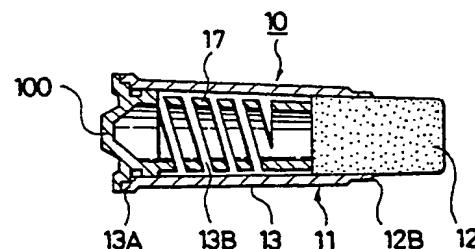


FIG.1(A)

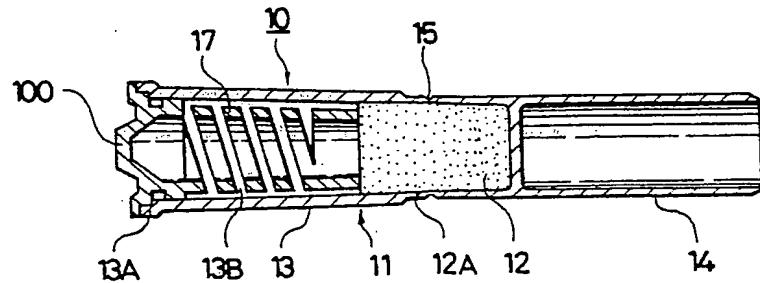
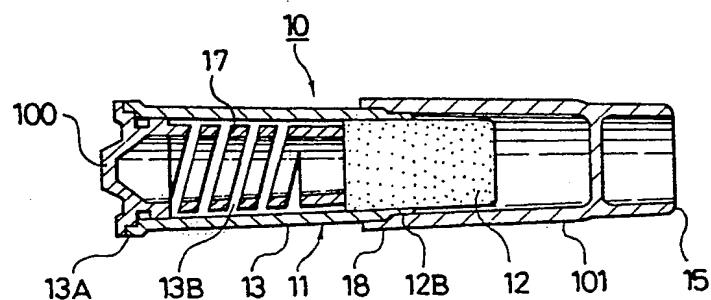


FIG.1(C)



DESCRIPTION

LIQUID APPLICATOR

5

INDUSTRIAL FIELD

The present invention relates to a liquid applicator which contains a small quantity of a liquid used for medical, cosmetic, office, cooking, mechanical processing, or cleaning 10 purpose and which has an applicator member, the applicator being capable of properly and effectively applying such a liquid to an objective part of a living body, office paper, cooking instrument, machine or a cleaning object.

15

BACKGROUND ART

Hitherto, medical liquid applicator have been known which include containers for containing the liquid and applicator members associated with the containers. There are two types of 20 such medical liquid applicators: a type in which a brush is provided on the cap of the container and a type having an applicator member held on the container. The applicator incorporating a brush is difficult to handle and is disadvantageous in that the bristles of the brush tend to

stimulate affected part of the living body. On the other hand, the second-mentioned type requires that the container can be deformed to enable the liquid to be squeezed off the applicator member, though this type of liquid applicator can be handled 5 more easily. Therefore, most of the known medical liquid applicator is composed of a container made of a deformable material, e.g., a plastic, and an applicator member fixed on the container.

In the medical liquid applicator of the type mentioned 10 above, since the container material is limited to a deformable material such as a plastic which enables squeezing of the liquid, it is not allowed to use a glass as the container material, despite that the glass exhibits various advantages such as resistance to sterilization process, prevention of 15 scattering of volatile solvent or volatile agent, prevention of absorption of medicine, and so forth.

Furthermore, in order that the container having a small volume can exhibit the deformability peculiar to the plastics, it is necessary that the container wall has a smaller wall 20 thickness as compared with containers of large volume or that the container material is soft and flexible. The ratio between the surface area of the container and the volume of the container varies in inverse proportion to 1/3 order of the volume, so that the ratio of the surface area to the volume

increases as the volume is decreased. This means that containers of smaller volume exhibit grater rate of evaporation/scattering of the liquid per unit volume. For instance, in order that a small container having a volume of 5 $1\text{m}\ell$ exhibits the same rate of evaporation/scattering as that of a container having a volume of 10 $\text{m}\ell$, it is necessary that the smaller container has a wall thickness which is 2.15 time as large that of the greater container or, alternatively, that the smaller container is made of a material having lower 10 permeability and, hence, a higher rigidity. Thus, production of a container having a small volume and large deformability is encountered with a problem in that two incompatible requirements must be met simultaneously: namely, the use of a thinner or more flexible material than that of the large 15 container to provide large deformability and the use of thicker and more rigid material to prevent evaporation/scattering. It is therefore difficult to reduce the volume of the container of the conventional medical liquid applicator having an applicator member foxed on the container, in order to prevent 20 evaporation/scattering of the liquid.

An object of the present invention is to provide a liquid applicator which has a container of any desired volume and made of a rigid and hard material and which allows the liquid to exude to the outer surface of the container and be spread

properly and effectively over an objective part.

DISCLOSURE OF THE INVENTION

5 The present invention in Claim 1 is that the liquid applicator comprises a container containing a liquid and an applicator member held on the container and capable of applying the liquid to an objective part, wherein the improvement comprises that the applicator member is mounted for movement 10 into and out of the container and that an repulsing member is provided to outwardly repulse the applicator member outwardly of the container, wherein, when the applicator member is pressed into the container against the force of the repulsing member, the liquid is caused to exude to the surface of the 15 applicator member outside the container.

Another feature of the present invention in Claim 2 is that the container includes a container body containing the liquid and made of a glass and/or a hard plastic so as to have an end enable to open, and a cap capable of hermetically closing 20 the opening of the container body, wherein the applicator member is held on the container body such that as portion of the applicator member is exposed through the opening in the container body.

Another feature of the present invention in Claim 3 is that

the container includes a container body containing the liquid and made of a glass and/or a hard plastic so as to have an end enable to open, and a sealing member for sealing the end of the container body, the sealing member and the container body being 5 integrally formed in such a manner that they can be separated when the liquid applicator is put to use, the applicator member being held on the container body such that a portion of the applicator member is exposed through the end which is opened after separation of the sealing member from the container body.

10 Another feature of the present invention in Claim 4 is that the urging member is housed in the container body.

Another feature of the present invention in Claim 5 is that the applicator member is made of a material permeable to the liquid .

15 Another feature of the present invention in Claim 6 is that the container body and the sealing member are formed integrally with each other and a breakable thin-walled portion is formed between the container body and the sealing member.

Another feature of the present invention in Claim 7 is that 20 the end of the sealing member opposite to the end where the sealing member integrated with the container body is so shaped as to fit to the container body after the sealing member is separated from the container body.

Another feature of the present invention in Claim 8 is that

the container has an ointment storage portion.

The present invention in Claim 9 is that the liquid applicator comprises a container containing a liquid and an applicator member held on the container and capable of applying 5 the liquid to an objective part wherein the improvement comprises that the applicator member is mounted for movement into and out of the container and that an repulsing member is provided to outwardly repulse the applicator member outwardly of the container, wherein, when the applicator member is 10 pressed into the container against the force of the repulsing member, the liquid is caused to exude to the surface of the applicator member outside the container, the liquid applicator further comprising a liquid dripping member having a cap-type member with a small port for dripping the liquid formed in the 15 end thereof, the dripping member being fitted on the container with the applicator member held therein so as to allow the applicator member to move into and out of the container.

Another feature of the present invention in Claim 10 is that the container includes a container body containing the 20 liquid and made of a glass and/or a hard plastic so as to have an end enable to open, and a cap capable of hermetically closing the opening of the container body, wherein the applicator member is held on the container body such that as portion of the applicator member is exposed through the opening in the

container body.

Another feature of the present invention in Claim 11 is that the container includes a container body containing the liquid and made of a glass and/or a hard plastic so as to have 5 an end enable to open, and a sealing member for sealing the end of the container body, the sealing member and the container body being integrally formed in such a manner that they can be separated when the liquid applicator is put to use, the applicator member being held on the container body such that a 10 portion of the applicator member is exposed through the end which is opened after separation of the sealing member from the container body.

Another feature of the present invention in Claim 12 is that the urging member is incorporated in the container body.

15 Another feature of the present invention in Claim 13 is that the applicator member is made of a material permeable to the liquid.

Another feature of the present invention in Claim 14 is that the container body and the sealing member are formed 20 integrally with each other and a rupturable thin-walled portion is formed between the container body and the sealing member.

Another feature of the present invention in Claim 15 is that the end of the sealing member opposite to the end where the sealing member integrated with the container body is so

shaped as to fit to the container body after the sealing member is separated from the container body.

Another feature of the present invention in Claim 16 is that the container has an ointment storage portion.

5 According to the present invention as set forth in Claim 1 to 8 and 9 to 16, the outer surface of the applicator member is simply pressed onto the objective portion so that the applicator member is pressed into the container overcoming the resilient force of the repulsing means, whereby the liquid is
10 caused to exude to the outer surface of the applicator through the applicator member.

It is therefore possible to apply the liquid without relying upon the deformability of the container. This means that rigid and hard material such as a glass and/or a hard
15 plastic can be used effectively as the material of the container. It is also possible to obtain an applicator having a container of a small volume and made of a plastic the thickness or rigidity of which being determined to provide sufficient evaporation/scattering prevention effect, enabling
20 smooth exudation of the liquid to the outer surface of the applicator member.

When the container is formed of a glass or a hard plastic, advantages are brought about such as high resistance to treatment in the sterilization process, prevention of

evaporation/scattering of volatile solvent and volatile medical agent, prevention of absorption of medical agent, and so forth.

When a container of a small volume is used in the liquid applicator of the present invention, the material and the 5 thickness of the container can be determined mainly from the view point of prevention of evaporation and absorption of the medical agent, without taking into consideration the deformability of the container. Thus, the container can be designed freely by using general-purpose polymers having small 10 moisture permeation and small agent absorption, e.g., high-density polyethylene (HDPE) and polypropylene (PP) which are generally rigid and, hence, have no deformability.

The applicator member in the liquid applicator of the present invention is formed of a material which exhibits a 15 large permeability to the liquid agent, e.g., cotton, non-woven cloth, paper, fibrous filter, bundle of long fibers and porous plastic.

Examples of the liquid which is contained in the liquid applicator of the present invention are liquid agents which are 20 applied to human skin for the purpose of disinfection or medical care, cosmetic liquids, liquids such as bonds to be applied to papers for office use, liquid such as oils to be applied to cooking instruments, liquids such as lubricants to be applied to machines, and liquids such as waxes to be applied

to objects which are to be cleaned and which is contained as the condition of the liquid.

Obviously, the present invention can be carried out in various forms through the containers of glass or hard plastic 5 and containers of small volume are specifically mentioned.

According to the invention set forth in Claims 9 to 16, it is possible to apply a liquid in such a manner that, after a portion of the applicator member is exposed, the liquid in the applicator can be dripped onto objective portion without 10 requiring the applicator member to be touched by the user's hand. When the condition of the objective portion does not allow a direct contact by the applicator member, it is possible to use a liquid dripping member which covers part or whole of the applicator member. When the dripping member covers the 15 entire area of the applicator member, the dripping member is provided with at least one communication hole. In use, the dripping member is fitted on the applicator member and is pressed so as to cause the liquid to be dripped onto the objective portion. The dripping member may be used in 20 combination with the liquid applicator as set forth in Claims 1 to 8.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1(A) is a sectional view of an embodiment of the present invention;

Fig. 1(B) is a sectional view showing the state of use;

Fig. 1(C) is a sectional view showing the state of use with 5 a modified cap attached to the applicator;

Fig. 2 is a sectional view of a second embodiment of the present invention;

Fig. 3 is a diagram illustrating the relationship between the deformability of the container and evaporation/scattering 10 prevention function of the container;

Fig. 4 is a sectional view of a third embodiment of the present invention;

Fig. 5 is a perspective view of a liquid dripping member; and

Fig. 6 is a perspective view of another liquid dripping 15 member.

BEST MODE FOR CARRYING OUT THE INVENTION

[First Embodiment]

20 A medical liquid applicator 10 shown in Figs. 1(A) to 1(C) is composed of a container 11 containing a liquid agent for a medical care and an applicator member 12 which is held by the container 11 and capable of applying the liquid agent to an effected part of a living body.

The container 11 includes a container body 13 for containing the liquid agent, the container body 13 being made of a glass and/or a hard plastic and which is provided with an end 12A which can be opened (see Fig. 1(A)), and a sealing 5 member 14 for sealing the end 12A. The container body 13 has a bottom plate 100 welded to the bottom portion 13A so as to form a liquid agent containing portion 13B.

The sealing member 14 and the container body 13 are formed integrally with each other through a structure which enables 10 the sealing member 14 to be separated from the container body 13, e.g., a thin-walled portion 15 (0.3 to 0.5 mm thick) forming a V-shaped recess. In use, the user pinches or grips the container body 13 and the sealing member 14 by the user's hands and applies a force so as to break the connection between 15 the container body 13 and the sealing member 14 at the thin-walled portion 15 thereby separating the sealing member 14 from the container body 13. The container 11 is designed such that the applicator member 12 is held on the container body 13 such that a portion of the applicator member 12 is exposed 20 through an open end 12B (see Fig. 1(B)) of the container body 13 after the separation of the sealing member 14.

The applicator member 12 is mounted so as to be movable into and out of the container body 13.

The medical liquid agent applicator 10 further has a spring

(repulsing member) 17 which repulses the applicator member 12 outwardly of the container 11. For instance, the spring 17 is formed from a plastic integrally with the bottom plate 100 and is accommodated in the liquid containing portion 13B of the 5 container body 13 at a position between the applicator member 12 and the bottom plate 100. The applicator member 12 which receives the resilient urging force of the spring 17 is prevented from springing out of the container because its peripheral edge portion is retained by a tapered inner surface 10 of the container body 13 and because its base end is connected to the spring 17. After the separation of the sealing member 14 from the container body 13, the liquid applicator 10 is ready for use. In this case, as the applicator member 12 is pressed into the liquid containing portion 13B of the container 15 body 13 against the force of the spring 17, the liquid agent is caused to exude to the outer surface of the applicator member 12 exposed from the container.

The applicator member 12 is preferably made of a material which is highly permeable to and inactive on the liquid agent 20 and which has a good shape holding characteristic, as well as ability to impart a good feel of contact when pressed to a human skin. It is also preferred that the material of the applicator member 12 has a resistance to breakage so as not to produce fractions. For instance, a generally cylindrical

bundle of a multiplicity of acetyl cellulose long fibers bonded together is suitably used as the applicator member. It is also possible to use a porous material as the material of the liquid applicator 12.

5 As is the case of a sealing member 101 shown in Fig. 1(C), the sealing member may be provided at its end opposite to then container body 13 with a fitting portion 18 which is adapted to fit on the open end 12B of the container body 13 after the severance of the sealing member from the container body 13 so
10 as to function as a cap.

The described medical liquid agent applicator 10 can be assembled by the following procedure. The applicator member 12 is inserted into the structure composed of the container body 13 and the sealing member 14 from the end adjacent to the bottom 15 plate 100. Then, filling the container body 13 with the liquid agent, the spring 17 integral with the bottom plate is inserted and then the bottom plate 100 is welded to the bottom portion 13A of the container body 13.

A description will now be given of the operation of the
20 medical liquid agent applicator 10.

According to this applicator 10, the applicator member 12 is pressed into the container against the force of the spring 17 simply by being pressed at its outer surface onto an affected part of the living body with a light force, so that

the internal pressure of the container is increased to cause the liquid agent in the container to be exuded to the surface of the applicator member 12 outside the container.

It is therefore possible to easily apply the liquid agent 5 without relying upon the deformability of the container. Thus, the liquid agent in the container 11 can smoothly exude to the surface of the applicator member 12 outside the container even when the container is made of a rigid and hard material such as a glass and/or a hard plastic and even when the container is a 10 small-size container having a thickness and rigidity large enough to provide anti-evaporation/scattering function.

Fig. 3 shows the relationship between the deformability of the container and the evaporation/scattering prevention function. In this Figure, the axis of abscissa represents the 15 number of days elapsed, while the axis of ordinate represents the amount of evaporation/scattering of distilled water when the same is held at 40°C in a curve (a) represents characteristic which is obtained when the container is a deformable container with a pipette type cap, while a curve 20 (b) shows the characteristic as obtained with a container which is sealed with a polypropylene of 1 mm thick and which has no deformability.

[Second Embodiment]

A medical liquid agent applicator 20 shown in Fig. 2 has a

container 21 and an applicator member 22, as in the case of the applicator 10 described before. The applicator member 22 is mounted for movement into and out of the container 21 and is outwardly repulsed by the spring 17 which is integral with the 5 bottom plate 100. The liquid agent in the container 21 is caused to exude to the surface of the applicator member 22 outside the container as the applicator member 22 is pressed into the container 21 against the force of the spring 17.

The container 21 of the applicator 20 includes a container 10 body 24 containing the liquid agent and made from a glass and/or a hard plastic so as to have an opening, and a cap 25 which can hermetically close the opening of the container body 24. The applicator member 22 is mounted on the container body 24 such that it is exposed from the opening of the container 15 body 24 when the cap 25 is removed.

[Third Embodiment]

A medical liquid agent applicator 30 shown in Fig. 4 has a container 31 and an applicator member 32, as in the cases of the applicators 10 and 20 described before. The applicator 20 member 32 is mounted for movement into and out of the container 31 and is outwardly repulsed by the spring 17 which is integral with the bottom plate 100. The liquid agent in the container 31 is caused to exude to the surface of the applicator member 32 outside the container as the applicator

member 32 is pressed into the container 21 against the force of the spring 17.

The applicator 30 of this embodiment is further provided with a dripping member 33. As shown in Figs. 5 and 6, the 5 dripping member 33 is a cap-like member having a dripping port 34 or 35 in the end thereof. When fitted on the container 31, the dripping member 33 is movable in response to a pressure P with the applicator member 32 held therein, so as to cause the applicator member 32 to move into and out of the container body 10 31.

In this applicator 30, therefore, it is possible to drip the liquid in the applicator 30 onto the affected part of a living body without requiring the applicator member to be touched by the user's hand after exposure of a part of the 15 applicator member 32. Namely, when the condition of the affected part does not allow a direct contact by the applicator member 32, it is possible to use the dripping member 33 in such a manner as to cover the entire part or a portion of the applicator member 32. When the dripping member 33 is shaped to 20 cover the entire area of the applicator member 32, the dripping member 32 is provided with at least one communication port 34 or 35. In use, the dripping member 33 is fitted on the applicator member 32 and is pressed so that the liquid agent drips onto the affected part through the communication port 34

or 35 in the dripping member 33.

In the medical applicators 10, 20 and 30 described above, the containers 11, 21 and 31 may have an ointment storage portion provided in the container body 13, 24, 36, sealing 5 member 14 or the cap 25.

INDUSTRIAL APPLICABILITY

The present invention is that the liquid applicator 10 comprises a container containing a liquid and an applicator member held on the container and capable of applying the liquid to an objective part, wherein the improvement comprises that the applicator member is mounted for movement into and out of the container and that an repulsing member is provided to 15 outwardly repulse the applicator member outwardly of the container, wherein, when the applicator member is pressed into the container against the force of the repulsing member, the liquid is caused to exude to the surface of the applicator member outside the container. Therefore, it is possible to 20 provide a liquid applicator which has a container of any desired volume and made of a rigid and hard material and which allows the liquid to exude to the outer surface of the container and be spread properly and effectively over an objective part.

The present invention is that liquid applicator comprises a container containing a liquid and an applicator member held on the container and capable of applying the liquid to an objective part, wherein the improvement comprises that the 5 applicator member is mounted for movement into and out of the container and that an repulsing member is provided to outwardly repulse the applicator member outwardly of the container, wherein, when the applicator member is pressed into the container against the force of the repulsing member, the liquid 10 is caused to exude to the surface of the applicator member outside the container, the liquid applicator further comprising a liquid dripping member having a cap-type member with a small port for dripping the liquid formed in the end thereof, the dripping member being fitted on the container with the 15 applicator member held therein so as to allow the applicator member to move into and out of the container. In addition to the advantages described before, therefore, an advantage is brought about in that the liquid in the applicator can be dripped onto the objective part without requiring the 20 applicator member to be touched by the user's hand after a portion of the application member is exposed.

In a preferred form of the present invention, the container body is made of a glass and/or a hard plastic so that advantages are obtained such as resistance to treatment in the

sterilization process, prevention of evaporation/scattering of volatile solvent or volatile liquid agent, prevention of absorption of the liquid agent, and so forth.

In another preferred form of the invention, the container 5 body and the sealing member are formed integrally with each other in such a manner as to be easily separated when the applicator is used, thus ensuring a complete hermetic seal during storage and easy opening at the time of use.

Consequently, the liquid applicator of the present 10 invention can find a wide use, besides the application of medical liquid agents. For example, it can be used as an applicator for applying a cosmetic liquid such as a manicure, a lip cream or eye line, an applicator for applying an office-use liquid such as a paste and a correction liquid, as well as a 15 marking and painting liquids, an applicator for applying a cooking oil or the like to a cooking instrument. An applicator of a liquid for machining such as a lubricant, and applicators of various other liquids such as a wax, detergent, shoe-shining cream, and so on.

CLAIMS

1. A liquid applicator comprising a container containing a liquid and an applicator member held on said container and capable of applying said liquid to an objective part, wherein the improvement comprises that said applicator member is mounted for movement into and out of said container and that an repulsing member is provided to outwardly repulse said applicator member outwardly of said container, wherein, when said applicator member is pressed into said container against the force of said repulsing member, the liquid is caused to exude to the surface of said applicator member outside said container. —
2. A liquid applicator according to Claim 1, wherein said container includes a container body containing said liquid and made of a glass and/or a hard plastic so as to have an opening, and a cap capable of hermetically closing said opening of said container body, wherein said applicator member is held on said container body such that a portion of said applicator member is exposed through said opening in said container body.
3. A liquid applicator according to Claim 1, wherein said container includes a container body containing said liquid and made of a glass and/or a hard plastic so as to have an end enable to open, and a sealing member for sealing the end of

said container body, said sealing member and said container body being integrally formed in such a manner that they can be separated when said liquid applicator is put to use, said applicator member being held on said container body such that a 5 portion of said applicator member is exposed through said end which is opened after separation of said sealing member from said container body.

4. A liquid applicator according to Claim 2 or 3, wherein said urging member is housed in said container body.
- 10 5. A liquid applicator according to one of Claims 1 to 4, wherein said applicator member is made of a material permeable to said liquid .
6. A liquid applicator according to one of Claims 3 to 5, wherein said container body and said sealing member are formed 15 integrally with each other and a breakable thin-walled portion is formed between said container body and said sealing member.
7. A liquid applicator according to one of Claims 3 to 6, wherein the end of said sealing member opposite to the end where said sealing member integrated with said container body is so 20 shaped as to fit to said container body after said sealing member is separated from said container body.
8. A liquid applicator according to one of Claims 1 to 7, wherein said container has an ointment storage portion.
9. A liquid applicator comprising a container containing a

liquid and an applicator member held on said container and capable of applying said liquid to an objective part, wherein the improvement comprises that said applicator member is mounted for movement into and out of said container and that a repulsing member is provided to outwardly repulse said applicator member outwardly of said container, wherein, when said applicator member is pressed into said container against the force of said repulsing member, the liquid is caused to exude to the surface of said applicator member outside said container, said liquid applicator further comprising a liquid dripping member having a cap-type member with a small port for dripping said liquid formed in the end thereof, said dripping member being fitted on said container with said applicator member held therein so as to allow said applicator member to move into and out of said container.

10. A liquid applicator according to Claim 9, wherein said container includes a container body containing said liquid and made of a glass and/or a hard plastic so as to have an end enable to open, and a cap capable of hermetically closing said opening 20 of said container body, wherein said applicator member is held on said container body such that as portion of said applicator member is exposed through said opening in said container body.

11. A liquid applicator according to Claim 9, wherein said container includes a container body containing said liquid and

made of a glass and/or a hard plastic so as to have an end enable to open, and a sealing member for sealing an end of said container body, said sealing member and said container body being integrally formed in such a manner that they can be 5 separated when said liquid applicator is put to use, said applicator member being held on said container body such that a portion of said applicator member is exposed through said end which is opened after separation of said sealing member from said container body.

10 12. A liquid applicator according to Claim 10 or 11, wherein said urging member is incorporated in said container body.

13. A liquid applicator according to one of Claims 9 to 12, wherein said applicator member is made of a material permeable to said liquid.

15 14. A liquid applicator according to one of Claims 11 to 13, wherein said container body and said sealing member are formed integrally with each other and a rupturable thin-walled portion is formed between said container body and said sealing member.

15. A liquid applicator according to one of Claims 11 to 14, 20 wherein the end of said sealing member opposite to the end where said sealing member integrated with said container body is so shaped as to fit to said container body after said sealing member is separated from said container body.

16. A liquid applicator according to one Claims 9 to 15,

25

wherein said container has an ointment storage portion.

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FIG. I(A)

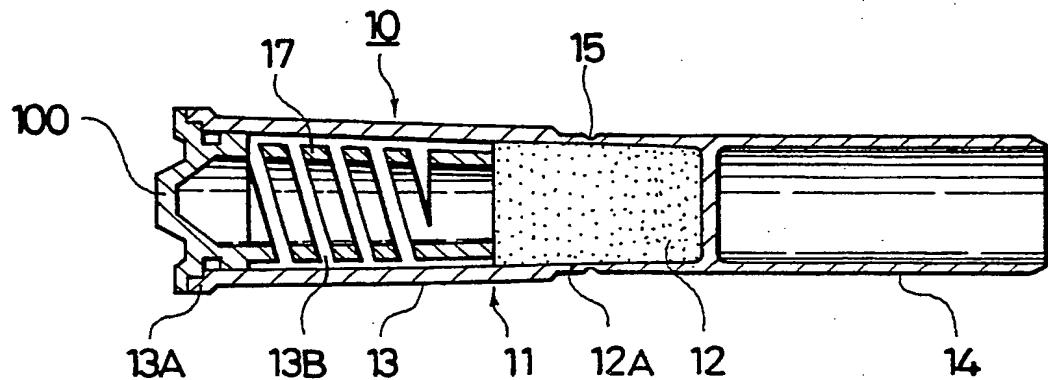


FIG. I(B)

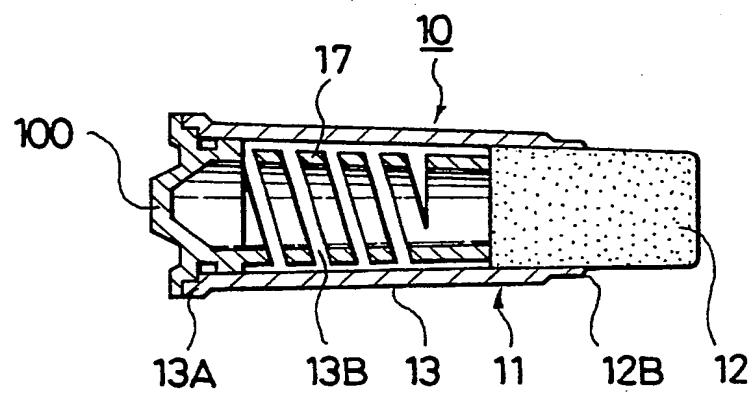


FIG. I(C)

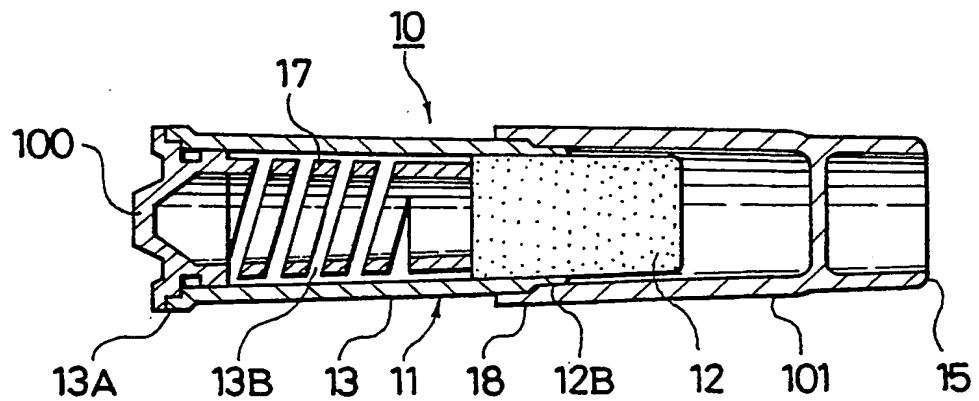


FIG.2

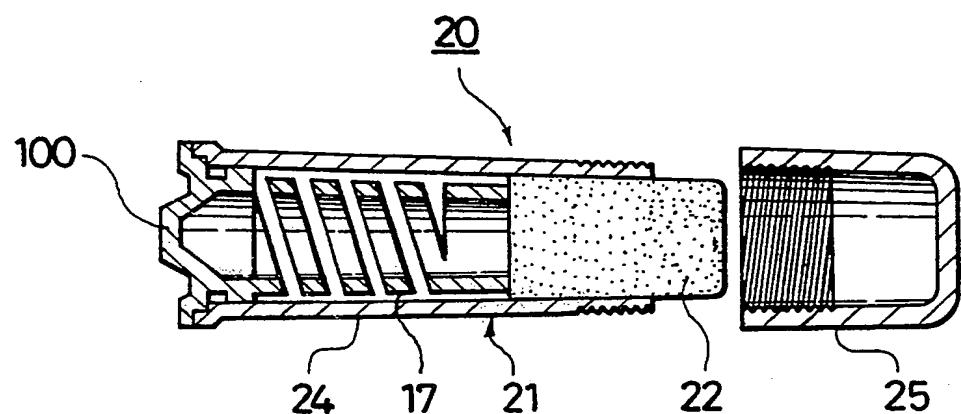


FIG.3

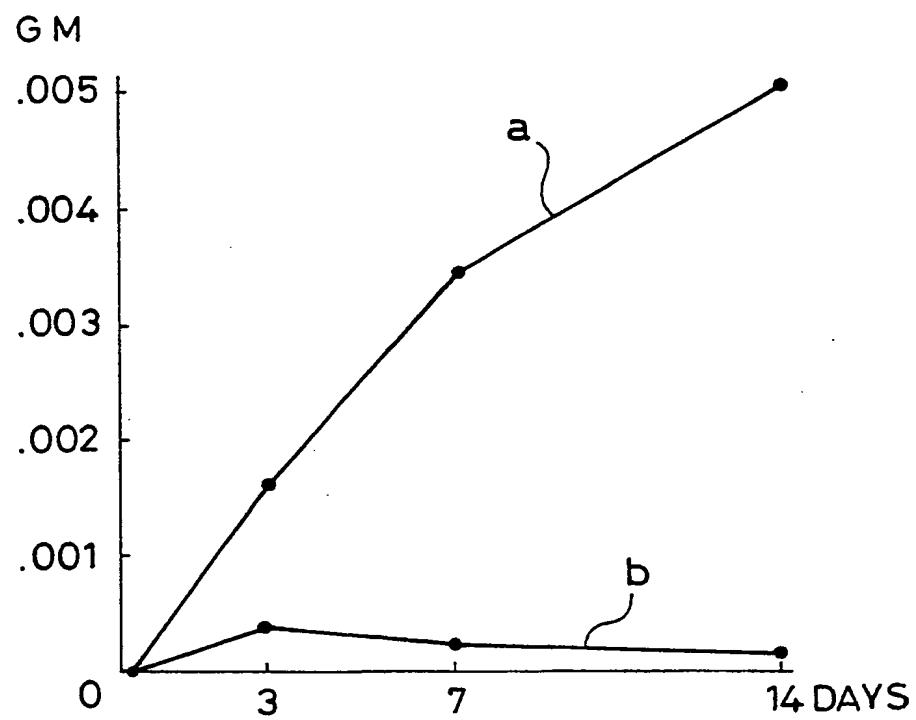


FIG.4

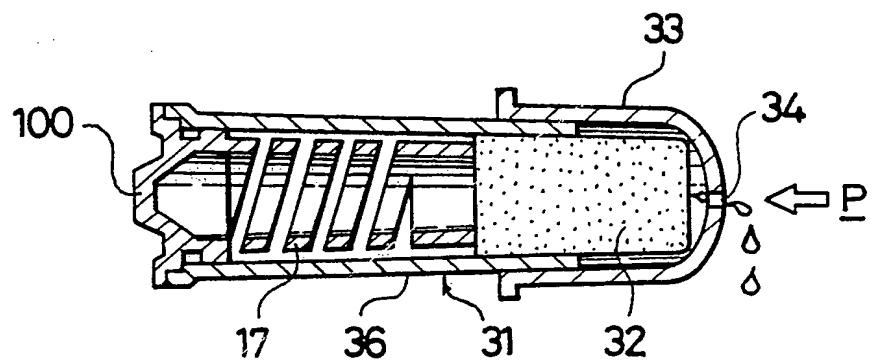


FIG.5

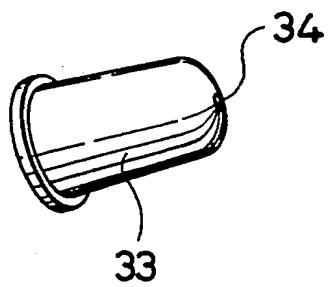
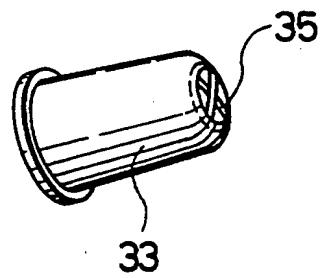


FIG.6



INTERNATIONAL SEARCH REPORT

International Application No. PCT/JP88/01234

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl ⁴ B05C17/00, A61M35/00, A45D34/04

II. FIELDS SEARCHED

Minimum Documentation Searched ⁷

Classification System	Classification Symbols
IPC	B05C17/00, A61M35/00, A45D34/04

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched ⁸

Jitsuyo Shinan Koho 1926 - 1988
Kokai Jitsuyo Shinan Koho 1971 - 1988

III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	JP, U, 57-184781 (Pentel Co., Ltd.) 24 November 1982 (24. 11. 82) (Family: none)	1, 2, 4-7
Y	JP, A, 57-55862 (Pacer Technology and Resources Inc.) 3 April 1982 (03. 04. 82) Page 3, lower left column, line 17 to lower right column, line 8, Figs. 5 to 6 & DE, A1, 3028080 & FR, A1, 2475503 & GB, A, 2068884 & AU, A1, 6759781 & US, A, 4334638 & FR, A1, 2497176	3-7

* Special categories of cited documents: ¹⁰

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
February 27, 1989 (27. 02. 89)	March 13, 1989 (13. 03. 89)
International Searching Authority	Signature of Authorized Officer
Japanese Patent Office	

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